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# **The influence of supplementary health insurance on switching behaviour: evidence on Swiss data**

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## *Abstract*

*This paper focuses on the switching behaviour of sickness fund enrollees in the Swiss health insurance system. Even though the new Federal Law on Social Health Insurance (LAMal) was implemented in 1996 to promote competition among health insurers, there still remains large premium variations within cantons. This indicates that competition has not been able so far to lead to a single price, and reveals some inertia among consumers who seem reluctant to switch to less expensive funds. We investigate one possible barrier to switching behaviour, namely the influence of the supplementary insurance on the choice for basic insurance plan in Switzerland, which has not been studied so far. Our aim is to analyse the two decisions (choice of health plan, subscription to supplementary insurance contracts). We use the data of the OFAS survey conducted in 2000 on health plan choice and import some additional data on the sickness funds (number of enrollees, premiums). The decision to switch is estimated by both logit and a fixed-effects logit models; two main explanatory variables are studied: premiums (for basic insurance contracts) and supplementary insurance. The results suggest that holding a supplementary insurance contract substantially decreases the propensity to switch. The switching decision is positively influenced by the expected gain of switching, measured by the premium differential. The expected gain of switching is higher for switchers with no supplementary insurance (CHF 19.44) than for switchers with supplementary insurance (CHF 13.06). The income level has a direct positive influence on the propensity to buy a supplementary insurance. This finding suggests that the purchase of supplementary insurance is influenced, not only by risk aversion, but also by the willingness to pay for the goods covered by the supplementary insurance, which would be higher for rich people. Bad health has a negative influence on the subscription to a supplementary contract, but is no longer significant when the income is introduced into the specification. All the information about health is captured by the income level, a low income being strongly correlated with a bad health status. Income and a supplementary insurance contract are observable by the insurance company, and can be used as tools for selection.*

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## **1. Introduction**

According to its advocates, competition in health insurance markets should promote efficiency in insurance and care delivery. However, it may have some potential drawbacks, linked to the incentives it provides for risk selection. Managed competition settings have been implemented to deal with these difficulties: homogenous contracts are defined to avoid competition on coverage, health funds are not allowed to turn down an enrollee and a risk-adjustment scheme is introduced to eliminate incentives for risk selection.

Nevertheless, the effectiveness of competition between sickness funds is a prerequisite before any assessment about its positive or potential harmful effects. Characterising consumer behaviour in health insurance choice is a crucial issue to examine whether competition is effective. This paper focuses on the switching behaviour of sickness funds enrollees in the Swiss health insurance system.

Actually, Switzerland is a wonderful case for studying competition in health insurance markets: in 1996, the Federal Law on Social Health Insurance (LAMal) was adopted, which aimed at introducing a perfect managed competition scheme. In Switzerland as opposed to all other countries, health insurance cannot be provided by the employer as a fringe benefit: the premium is fully paid by the enrollee, which should make her more reactive to differences in premiums.

The reform introduced by the LAMal was designed in line with the managed competition scheme. The basic health insurance was defined as a homogenous product, i.e. full coverage in basic health insurance, with competition in price only. In theory, premium differences for the basic package should then disappear. However, empirical results on Swiss data do not support this prediction (Beck et al., 2003 ; Colombo, 2002): since 1996, the premium variability has been quite large and has decreased only slightly. This disappointing result suggests several interpretations. It may reveal: (i) differences in service quality, (ii) inertia of consumers resulting from switching costs, (iii) risk selection practices by the insurers, (iv) cross subsidies between basic and supplementary insurance.

We focus on the fourth interpretation (iv). Despite the fact that it is forbidden to sell basic and supplementary insurance as a joint contract, suppliers' behaviour relative to the pricing of supplementary insurance contracts may induce some perverse effects on the basic insurance market. Our purpose is to evaluate the influence of the supplementary insurance on the choice for basic insurance plan in Switzerland. A survey carried out by the Federal Office of Social Insurance (OFAS) show that 75 % of insurees have subscribed to at least one supplementary insurance contract. These contracts are usually subscribed with the same insurer as for the basic contract.

This paper studies the decisions to switch and to subscribe to a supplementary insurance contract. It is structured as follows. Section 2 provides a literature review on health plan choice. Some theoretical analysis is offered in section 3. Section 4 describes the data. The related descriptive statistics on the performance of the market and on

consumer choices are provided in section 5. The econometric specification and the results are presented in section 6. Concluding remarks and a discussion of implications are included in the final section of the paper.

## **2. Health insurance choice: present state of knowledge**

Outside the US, many industrialised countries have a social health insurance where citizens cannot choose between different payers for the basic coverage. Only recently health plan choice has been introduced in the social health insurance systems of Germany and the Netherlands, whereas this has been a traditional feature of the Swiss health insurance system. Israel and Belgium also have a social health insurance system with health plan choice.

The empirical literature relative to the switching behaviour of consumers leads to very different results, depending on national regulatory systems and institutional context. Premium elasticities of plan choice range from  $-8.4$  to  $-0.1$  (Schut et al., 2003; Laske-Aldershof and Schut, 2002; Buchmueller, 2000; Buchmueller and Feldstein, 1997; Royalty and Solomon, 1999).

A result common to many papers is the higher propensity to switch of young, healthy and highly educated individuals. As noted by Strombom et al. (2002), this finding means that plans that increase their price relative to competitors will not only lose market share, but will experience an increase in costs due to adverse retention.

As concerns differences in switching elasticities between countries, Schut et al. (2003) show that the propensity to switch is much larger in Germany than in the Netherlands. There are several possible explanations for this observed difference in consumer switching behaviour. First, differences in premium paid by consumers are much larger in Germany than in the Netherlands. The relative small price difference among Dutch sickness funds may not be sufficient to compensate the transaction costs involved in switching from one sickness fund to another. Second, incentives for employers are different in Germany and in the Netherlands: in the Netherlands, employers contribute a uniform percentage of employees' income, independent of their choice of sickness fund. By contrast, in Germany, the level of employer contributions strongly depends on their employees' choice of sickness fund. Hence, employers seem to play an important role in facilitating consumer choice and motivating their employees to switch to a cheaper (company-based) sickness fund. More recently, Tamm *et al.* (2007) showed that short-run price elasticities in Germany are smaller than previously found by other studies. In the long run, however, their estimates give evidence of substantial price effects.

Schut et al. (2003) and Laske-Aldershof and Schut (2002) explain the inertia of Dutch consumers by the magnitude of switching cost in comparison to the relatively small differences between premiums, i.e. expected gain of switching. However, this result can be interpreted quite differently and has to be examined more thoroughly. As stated by Laske-Aldershof and Schut (2002), despite the fact that it is forbidden to sell basic and supplementary insurance as a conjunct product, there is a discrepancy between the rules and the practice: actually, compulsory and supplementary insurance are tied in the Dutch system. Therefore, one has to take the

issue of supplementary insurance combined with compulsory insurance into account: this creates heterogeneity between insurance plans in terms of premiums and coverage. A stable equilibrium can be reached, with no need for switching, whether or not there are switching costs.

International comparisons of five countries in which health plan choice is possible (Laske-Alderhof et al., 2004) indicate that switching rates are larger in Germany and Switzerland than in Belgium, the Netherlands, or Israel. The authors attribute these higher switching rates to three main features. First, basic insurance contracts have options (in Switzerland, the deductible level may be chosen). Second, the potential benefits (monetary gains) from switching are larger in Germany or Switzerland than in the three other countries. Third, the insurance market seems more competitive in Germany and Switzerland: the level of market concentration is relatively low, and there are no barriers to entry.

One important issue in managed competition setting is the possibility, offered to insurance companies to selectively contract with health care providers. Then, choosing one health plan gives the consumer an access to a specific provider network, with a given quality of care. Beyond the role of price elasticities, many papers tried recently to evaluate the impact of quality of care on switching behavior. Using US data, Beaulieu (2002) finds that quality information has a small, but significant effect on consumer plan choices. This result is not supported by Abraham et al (2006), who show that information about higher quality alternatives is not connected with the switching probability. Conversely, patients place a high value on their relationship with their personal physician which makes switching more costly.

In Switzerland, switching behavior is likely to be weakly influenced by the quality of care. Indeed, less than 10% of enrolees have chosen an HMO option. The others have unlimited access to all care providers.

One report done by OFAS in 2001 and two studies are available on health insurance choice in Switzerland (Colombo, 2001 ; Beck et al., 2003). The OFAS report stresses that only a minority of households have switched from their basic health sickness fund since the introduction of LAMal. However the results show that there is a switch potential because 50% of households complain about the financial burden of basic insurance. Both Colombo (2001) and Beck et al. (2003) underscore the lack of convergence of premiums across sickness funds. However, they deliver rather different assessments of the functioning of the Swiss health insurance system.

On the one hand, Colombo (2001) puts the stress on consumer inertia: annual switching percentages are very low and seem to decrease steadily from 5.4% in 1998 to 2.1% in 2000. According to her, this inertia is attributable to switching costs linked to the costs of collecting information about relative performance of sickness funds: “Switching is in fact a time consuming exercise that involves transaction costs on the side of individuals. Information on sickness funds performance is currently inadequate and not easily comparable.” (Colombo, 2001). Analysing the responses to the OFAS survey, she shows that individuals are not always well informed. Some consumers may think that sickness funds can risk adjust and cream skim, because they do not know that the health insurance reform introduced a clear-cut regulatory separation between basic compulsory insurance (regulated by the LAMal) and the supplementary voluntary health insurance (regulated by the Insurance Contract Law (LCA)). In addition, some consumers think that they cannot split supplementary from basic insurance and

purchase them from two different funds. Colombo (2001) concludes that the goals of the LAMal are not fulfilled: the lack of sensitivity of switching behaviour to sickness fund performance leads to an unhealthy competition. It does not create cost-containment incentives but incentives to risk selection. She suggests to improve the individual choice mechanism by providing a better access to information and introducing a clear separation of LAMal coverage from supplementary insurance.

On the other hand, Beck et al. (2003) adopt an econometric approach which leads them to an opposite assessment of the Swiss health insurance market. On the basis of models close to the specifications used by Schut et al. (2003) (with additional fixed effects for taking heterogeneity between cantons into account), they estimate premium elasticities which range between  $-2.1$  and  $-1.0$ . These results are obtained on cantonal data which were provided by OFAS or on micro data from a sickness fund. The magnitude of their estimates is far from negligible: they range between the elasticities reported for the Netherlands by Schut et al. (2003) and the elasticities reported for Germany. The problem of Beck et al. (2003) is then to explain high and permanent premium differentials, together with a non negligible mobility of consumers between sickness funds, characterised by high elasticities. They use an interpretation in terms of “conglomerate” (cartel): a subgroup of some sickness funds may work together and move their members from one insurer to the other within the conglomerate, in order to create a homogenous risk profile within each fund. In this case, the flat rate premium of each fund of the conglomerate can evolve toward a risk-rated premium. Beck et al. (2003) give an empirical support to this interpretation: whereas the overall premium elasticity estimated on data relative to all cantons and funds is quite large, the premium elasticity estimated on the sub-sample of insurers suspected to apply this strategy of conglomerate is small and not significant.

As opposed to Colombo, Beck et al. (2003) consider that switching costs are negligible: “the basic insurance coverage is identical from one health insurer to the other, and both basic and supplementary premium information is freely and easily available on the web or from the federal office, which keeps the cost and amount of effort needed to retrieve the relevant information low. In addition, the actual switching procedure is quite simple: it is entirely sufficient to write a letter to one’s health insurer.”(Beck et al., 2003).

Finally, Beck et al. (2003) maintain that the present Swiss health insurance system gives insurers a strong incentive for risk-based selection. This is due to the rule of flat rates for premiums, together with an inefficient risk compensation mechanism. The latter being based on a too simple formula, leads in fact to an unfair compensation for all high-risk profiles. According to Beck et al. (2003), the legislator should authorise risk rated premiums or improve the risk adjustment formula.

The representations of the Swiss health insurance system given by Colombo (2001) and Beck et al. (2003) are very contrasted. Both notice the lack of premium convergence and healthy competition mechanisms. But Colombo underlines the consumer inertia due to switching costs, whereas Beck et al. (2003) give evidence of consumer mobility and put the stress on risk selection practices. Both suggest that supplementary insurance may have some influence on switching behaviour but do not make a thorough analysis of this issue.

The common view is that in Switzerland supplementary insurance contracts only cover some rare events. However, the proportion of health expenditures financed by supplementary insurance appears to be far from



negligible. The supplementary insurance accounts for 30.9 % of health insurance financing (mandatory basic insurance covers 66.7 %). This financing is mainly operated by sickness funds (23 %) followed by private insurers (7.9 %). The OFAS survey shows that only 7% of Swiss residents who have subscribed to a supplementary insurance contract did so with an insurer different from the sickness fund providing their basic coverage. As regards supply behaviour, sickness funds can risk adjust indirectly if they tie the conditions of a supplementary health insurance contract to the possession of a basic health insurance contract at the same fund. As insurers can make profit in the provision of supplementary health insurance, they have incentives to attract and retain good risks. As regards practices, Colombo (2001) reports that many people complained that reimbursement delays deteriorated after they separated basic and supplementary health insurance in two different sickness funds. “Such separation is in addition very impractical because doctors and hospitals do not separate bills for services included under the two different covers. Finally, premiums for supplementary health insurance may be more expensive if people are not insured by the same fund for basic health insurance”.

Paolucci et al. (2006) examine the role of supplementary health insurance as a potential tool for risk-selection in five countries. Their approach is mainly institutional: they compare the regulatory settings concerning health insurance markets. The authors conclude that supplementary health insurance may be a selection tool in Switzerland while incentives to use it for risk selection are increasing in Netherlands.

This point is analysed from a normative perspective by Kifmann (2006), who studies the relative social costs and benefits of allowing the same insurance funds to be active on both markets (for basic and supplementary insurance). Under the assumption that subscription to a supplementary insurance contract is exogenous and random, Kifmann (2006) shows that insurers cream-skin on the basic insurance market by selling supplementary insurance contracts below marginal cost. However, it is more efficient to separate the two markets if integrating both activities leads to large savings (administrative costs).

These features are likely to strongly influence the choice of sickness fund for basic insurance, switching behaviour and more generally the market of health insurance.

Our purpose is to evaluate the influence of supplementary health insurance on switching behaviour in Switzerland. In particular, we examine the switching behavior of sickness funds enrolees, and the relative importance of two main elements in the switching decision: premiums (for basic insurance contracts), and supplementary insurance. Supplementary insurance may affect the decision to switch in two ways. First, subscribing basic and supplementary contracts with two different insurers may induce some administrative costs (for the subscriber) such as sending separate bills, etc. Second, even though switching is relatively simple for basic insurance, it may be more difficult for supplementary contracts: the new insurer may not offer similar contracts, or may require some medical examination before accepting a new customer.

### **3. Theoretical background**

In most cases, the choice of an insurer involves different kinds of contracts: one for the basic health care goods (covered by LAMal), and one or more supplementary contracts that cover additional goods or services. Even though the latter may be purchased from a different insurer, they impact the terms of choice for the basic contract, since administrative costs of subscribing various contracts from different insurers may be substantial. Thus, a better understanding of switching behaviour for the basic insurance contract also requires to analyse the decision to buy a supplementary insurance contract.

A simple model of demand may be derived along the following lines. Notice that models that represent health care costs as an exogenous monetary loss are often misleading. Indeed, insurance contracts cover part of the costs associated with some health care goods : health care consumption is endogenous, and may indeed be increased by insurance coverage. This is true for basic health care, but may be even more true for non basic health care expenditures. To take that into account, multivariate models may bring some interesting insight (see, e.g., Geoffard 2006). Denote by  $x$  such goods ( $x_1$  may be basic health care, and  $x_i, i > 1$  additional services such as a private room, alternative medicine drugs, etc.). The utility derived from such goods depends on the health state  $h$  (which may be multidimensional), and also on some consumption good  $c$  :  $u(c, x, h)$ . The simplest version of this model is a health-capital type of model in which health  $h$  and health care  $x$  are inputs in a health production function  $H(x, h)$ , and utility only depends on  $c$  and  $H$ :  $u(c, x, h) = U(c, H(x, h))$ . In that case demand for health care is derived from the demand for health. However, especially if we think of non-basic “health care” goods such as a private room in case of hospitalisation, utility may be derived directly from the consumption of  $x$ . Insurance contracts affect the cost  $C(x)$  of goods  $x$ , and the indirect ex post utility writes as :  $v(W, h) = \max u(c, x, h)$ , under the condition that  $c + C(x) \leq W$ . An insurance contracts lowers  $C(x)$  at the cost of paying a premium that lowers  $W$ . Ex ante demand for an insurance contract stems from individuals who expect that they will have a large ex post willingness for goods  $x$ . This may be due to health effect  $h$ , or to some other determinants such as income. With respect to income, different health care goods may show various features. Ex post demand for basic health care may not increase with income, whereas a private room at the hospital may be a normal or even a luxury good. The (ex ante) demand for insurance contracts that reimburse part of the purchasing costs of these goods also depends on the likelihood that these goods will be desirable ex post. For instance, the demand for a supplementary contract that pays for a private room may increase with income, even if the probability to be hospitalised decreases with income. This is at odds with insurance against monetary risk, for which the standard “DARA” assumption (decreasing absolute risk aversion) leads to a demand for monetary insurance that decreases with income. However, for goods with no ex post income effect (e.g., for basic health care), the DARA assumption would lead to a decreasing demand for insurance.

In terms of supply, the effects are even more difficult to integrate in a complete model. Here, the likelihood of bad health and the willingness to pay for some services both matter for the computation of expected costs, and hence for supplier incentives : the distribution of future health as well as other determinants of ex post demand such as income play key roles in the supply of insurance contracts. For instance, the purchase of a supplementary insurance contract may reveal that the insured has a high income, which could signal good health and hence lower expected basic health care consumption. In that case, supplying supplementary insurance contracts may be an indirect way for an insurer to attract « good risks » in terms of basic insurance. But the purchase of a

supplementary insurance contract may also directly reveal a larger probability of bad health, with a positive effect on basic health care expenditure...

Unfortunately, economic theory has failed so far to provide a convincing model of competitive equilibrium under multidimensional adverse selection, and such a model would be beyond the scope of the present paper. All that can be said is that the interplay between on one hand the demand for supplementary contracts, the demand for basic contracts, and the choice of an insurer (or different insurers) and on the other hand the supply of such contracts may show very different features. Supplementary insurance contracts may be used as a selection device, but the purchase of such a contract may reveal a large willingness to pay for additional services (and thus a high income, often associated with better health and sometimes with lower basic health care costs) or a high probability to be ill (associated with poor health and higher basic health care costs). The link between the markets for supplementary and basic insurance contracts still remains to be understood, and we hope that the present empirical analysis may suggest some theoretical interpretations.

#### **4. Data**

We use two sources of data, the OFAS survey (2001) and information extracted from the cantonal data base that we have constructed.

##### *The OFAS survey*

To study the switching behaviour of the Swiss health enrolees, we used the data collected by OFAS (2001) as part of a general assessment of the Law on Sickness Insurance (Art. 32 OAMal). As previously mentioned, a detailed descriptive analysis of this dataset is available in the OFAS report (2001) and is also provided by Colombo (2002). However, as far as we know, no further analysis was performed.

This database was obtained from the Swiss Information and Data Archive Service (SIDOS). It displays information on 2,152 individuals who were surveyed by telephone during the early summer 2000. Selecting individuals older than 26, and allowing for missing information relative to income leads to a sample of 1,943 individuals<sup>1</sup>. Extensive information is collected at the micro level (individual or household, depending on the question) concerning health plan choice. People were requested to name their insurance funds for the basic and supplementary health insurance package separately and to define their criteria for the choice of insurers. The options they had opted for (deductibles, HMO) and the composition of the supplementary benefit package were also reported. Respondents were asked whether they had changed any of their health insurance contracts during the four previous years (1996-1999). “Switching” and “non switching” behaviours were accounted for. Furthermore, intention to switch in the future as well as socio-demographic and general satisfaction towards insurance coverage were collected. Knowledge, beliefs and attitudes towards LAMal were investigated. This survey does not provide any information about the individual premiums paid for the supplementary health insurance contracts. In addition, there is no information about the level of individual health expenditures.

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<sup>1</sup> According to the LAMal, premiums are set differently for people aged 18-26.

### *The cantonal database*

We have constructed a second dataset including information relative to each insurer company for the 26 Swiss cantons over the years 1996 to 2005. Insurer-related information includes the number of insured people per sickness fund within each canton, and the premiums (per person and month) for each fund (for each premium region) during the years 1996 to 2005. Finally, the database is made of 12,423 observations (one line per insurance company, per canton and per year). This second dataset will be referred to as “cantonal database”.

This dataset will be used to define the gains associated with switching by making the connection between the information about the sickness fund chosen in the OFAS survey and the premiums of all competitors available in the cantonal database. Notice that premiums cannot be regarded as exogenous at this macroeconomic level. This database cannot be used alone to study directly the demand for insurance and the switching behaviour.

## **5. Descriptive analysis**

### *5.1. At the macro level: did competition induce some decrease in premium variability?*

In principle, competition in price, together with homogenous contracts, should induce a reduction in premium differences. Empirical results obtained from the cantonal database do not support this prediction.

In the cantonal database, information relative to premiums is recorded at three levels: sickness fund, cantons and year. Each year, the double dimension of the data allows us to identify, in the changes over time of the premium variability, what is due to changes in the between-cantons variability and what can be attributed to changes in the within-canton variability.

Denoting by  $p_{j,c,t}$  the premium paid for the basic insurance in sickness fund  $j$  in canton  $c$  in year  $t$ , one has:

$$V(p_{j,c,t}) = V(p_{.,c,t}) + V(p_{j,c,t} - p_{.,c,t}),$$

where  $V(p_{j,c,t})$  is the overall variance of premiums in year  $t$  and  $V(p_{.,c,t})$  is the between-canton variance of premiums (it is equal for each year to the variance of the average premium per canton).  $V(p_{j,c,t} - p_{.,c,t})$  is the within-canton variance of premiums. Given that competition takes place within each canton, any assessment on competition effectiveness should be based on this second term only.

Graph 1 displays the annual values of the total, between-canton and within-canton standard deviations, computed for  $\text{Log}(p_{j,c,t})$ . We used the log transformation for changes in premium variability not to be affected by premium increase over time. We computed weighted indicators to take into account the number of enrolees per sickness funds. The value of the overall standard deviation is decreasing very slightly over time, from 22 % in 1996 to 18 % in 2005. This small decrease is mainly due to a decrease in the between-canton standard deviation. As stated above, the competition takes place within the framework of each canton: the within-canton standard deviation only is likely to be affected by the potential effect of competition. Graph 1 shows that it is rather stable over time (it varies from 8 % to 7% between 1996 and 2005), suggesting that there is no significant premium convergence within cantons.

Graph 2 shows that the proportion of overall variability due to average differences in premiums between cantons is sizeable: more than 80% is due to average differences between cantons. Adjusting premiums for differences in the gender and age composition of the enrolees does not change substantially this result. The high proportion of between cantons variability may derive from pricing strategy on the supply side. It questions the relevance of limiting competition to the canton level.

Graph 3 displays the annual values of the ratio of the ninth to first decile of the premium distribution. The ratio is computed for each canton, then an average is calculated, weighting the cantonal ratios by the number of enrolees in each canton. The same computation is implemented for the ratio of the third to first quartile of the premium. The figures of Graph 3 are more easy to interpret than the standard deviations computed above: there is a difference of about 20% between the ninth and the first decile of the premium, and a difference of around 10% between the third and the first quartile. One observes again that the decrease over time of  $Q3/Q1$ , if significant, is very tiny. It is more marked for  $D9/D1$ . Graph 4 makes it possible to examine more closely this small reduction. Following the same procedure as above, we computed the annual values of  $D9/D5$  and  $D5/D1$ , where  $D5$  stands for the median. Graph 4 shows that, at the beginning of the period, the dispersion is at the same level at the top and at the bottom of the distribution, then falls slightly at the top of the distribution (see  $D9/D5$ ), suggesting there is some impact of competition on high premiums. However, the observed changes are very small. On the whole, there is no sizeable decrease in premium variability, the competition does not seem to be effective.

### *5.2 The individual level: basic features of the data*

The OFAS survey displays information at the micro level. Basic features of this information is provided in Table 1. During period 1996-2000, 14.3% individuals switched from one sickness fund to another. In the year 2000, 9.5 % were considering to switch.

A supplementary insurance contract of any kind was subscribed to by 74.8 % enrolees. In Switzerland, an individual may subscribe to several potential contracts for supplementary coverage: dental care, first and second class treatments in hospitals, cross-border care, alternative medicine, sick-leave payments, etc. There is also a very simple contract, the “Division commune Suisse entière”, which extends the basic coverage to any Swiss hospital, not only those in the home Canton. This contract is offered by most insurers at low cost and without any medical examination. When excluding the supplementary insurance relative to “Division commune Suisse entière”, the proportion of enrolees covered by a supplementary insurance falls to 64.6 %. Table 2 shows that the subscription to a supplementary insurance is not significantly linked to gender. Conversely, age is significantly connected to supplementary coverage: people aged 35-65 are more likely to subscribe to a supplementary insurance contract (except for “Division commune Suisse entière”).

The survey records the household’s income as a categorical variable with 11 categories. We aggregated this information into three categories: income lower than 5,000 CHF (i.e. 3,300 €), income between 5,000 and 8,000 CHF, income higher than 8,000 CHF (i.e. 5,280 €). The threshold for the lowest category might seem rather high (in the eyes of the basic European citizen). Actually, it is representative of the Swiss income distribution. Information about household’s income was missing for 367 individuals. We checked that the recording of income is not significantly connected with the probability to switch ( $p=151$ ). To avoid losing too many observations, we implemented an ordered probit estimation to predict the missing values of income. This was

possible for 264 observations, using the following explanatory variables: age, gender, employment status, education level, family size, location, health status, as well as cantonal fixed effects.

The information displayed in table 1 shows that more than one third of individuals belong to the lowest income category, the highest category covering less than one fourth of individuals. Within one insurance compagny, in a given canton, premiums are community rated. However, a state subsidy set at the canton level help people with a low level of resources to pay their premium. The generosity of the coverage, and the eligibility criteria depend on the canton: on the whole, 23 % of the respondants benefit from such a subsidy.

Table 3 shows that having subscribed to a supplementary insurance is negatively connected with the propensity to switch: the probability of switching is one third lower (odds ratio equal to 72 %, with a level of significance  $p=0.001$ ) when the individual has a supplementary insurance. The *intention* to switch seems to be independent of supplementary insurance: having a supplementary insurance is not significant when we study the intention to switch (odds ratio equal to 93 %,  $p=0.66$ ). Graph 5 displays more information about switching propensity in relation to age group and supplementary insurance status. Young people exhibit a high switching propensity, whatever their supplementary insurance status. This is not the case for older people: their switching propensity appears to decrease with age. In addition, it is clearly reduced by a supplementary coverage.

Health status is measured by the individual's self assessed health, which is recorded on a five point scale that we collapsed into three categories: Bad, Good and Very good. Table 1 shows that about 17 % individuals grade their health as Bad and 35 % as Very good. The level of income is strongly related to self-assessed health, the richer being in better health (table 3bis). The magnitude of the influence is amazing: the probability to be in bad health decreases by two-third for people earning an income in the intermediate category. For people belonging to the high income category, the probability to be in bad health is divided by five, in comparison with low-income individuals. People having subscribed to a supplementary insurance are in a rather good health (the odds ratio equals 0.72 in table 3bis). But this impact is entirely due to the influence of income on the supplementary insurance: when incorporating both supplementary insurance and income in the logistic model, one finds that the impact of supplementary insurance on the probability to be in bad health is no longer significant.

## 6. Estimation and results

### 6.1. Econometric specification

#### *Switching behaviour*

We estimate a model explaining the switching decision in the past. Consider the binary variable  $y_i$  defined by  $y_i = 1$  if the individual has switched and  $y_i = 0$  when he/she has not switched. We model the benefit of switching as a latent (unobserved) variable  $y_i^*$  defined by :

$$y_i^* = x_i' \beta + (dp)_i \eta + s_i \gamma + u_i, \quad (1)$$

where  $x_i'$  is a vector of individual characteristics (age, gender, education, health status, level of the deductible) and  $s_i$  is a dummy variable indicating whether the individual has subscribed to supplementary insurance.  $(dp)_i$

is a variable relative to the premium paid for the basic insurance. It is defined as the expected difference between the premium of the new sickness fund and the premium of the former one.  $u_i$  is a disturbance supposed to follow a normal or a logistic distribution.

The decision to switch is given by :

$$y_i = 1 \text{ if } y_i^* \geq 0. \quad (2)$$

The variable  $dp_i$  is defined to capture the monetary gain of switching in terms of cost to be insured (for the basic insurance). We observe the level of the premium of the sickness fund chosen. In a given year, if individual  $i$  comes from sickness fund  $k$  and switches to fund  $j$ , the monetary gain of switching is equal to  $p_{ik} - p_{ij}$ . We constructed a variable that indicates switching gains, both for switchers and non-switchers. However, we do not observe the fund the switchers come from. Thus, we compute the expected gain of switching as follows:

$$(dp)_i = E[p_{ik} - p_{ij} | k \neq j] = \sum_{k \neq j} (p_{ik} - p_{ij}) \left( \frac{n_k}{\sum_{k \neq j} n_k} \right) \quad (3)$$

where  $n_k$  is the number of enrolees of sickness fund  $k$ . This definition of the expected gain of switching is based on the assumption that the probability of  $i$  to come from sickness fund  $k$  is equal to the proportion observed for all individuals of the sample in the year preceding the switch.

For non-switchers, the variable  $dp_i$  represents the *potential* switching gains, if the fund is chosen at random. It undervalues potential switching gains for non-switchers, given that a fund is actually not chosen randomly, but because it is the least expensive one.

#### *Decision to subscribe to a supplementary insurance contract*

We also estimate a model explaining the decision to subscribe to at least one supplementary insurance contract (except “Division commune Suisse entière”). The benefit of subscribing is specified as a latent variable  $s_i^*$  defined by:

$$s_i^* = z_i' \alpha + (dp)_i \delta + v_i, \quad (4)$$

where  $z_i'$  is a vector of individual characteristics. The decision to subscribe is given by:

$$s_i = 1 \text{ if } s_i^* \geq 0. \quad (5)$$

The premium differential  $(dp)_i$  for basic insurance is in principle not linked with the decision to subscribe. We include it into specification (4) to check whether it is correlated or not with the supplementary insurance indicator  $s_i$ .

#### *A bivariate model of decisions to switch and to subscribe to a supplementary insurance*

In line with the theoretical analysis, the empirical work consists in estimating a simultaneous equation model of joint decision to switch and to subscribe to a supplementary insurance contract. A separate estimation of

equations (1) and (4) would lead to asymptotically biased estimates if their disturbances ( $u_i$  and  $v_i$ ) were correlated.

The disturbances  $u_i$  and  $v_i$  may be correlated for several reasons. Both are influenced by unobserved heterogeneity relative to individual  $i$ , in other words, by unobserved variables which influence the decisions we try to explain. It may be, for instance, risk aversion, health status (since the subjective evaluation we observe is a rather poor indicator), the weight of health in the utility function of the individual, etc. Another source of bias is the fact that the premium of the supplementary insurance is unobserved. According to the theoretical model, this variable is an explanatory variable of the decision to subscribe to supplementary insurance and of the decision to switch. Therefore it will be a component of disturbances  $u_i$  and  $v_i$ . In this case,  $u_i$  and  $v_i$  are correlated and the variable  $s_i$  (indicating that the individual has a supplementary insurance) is not exogenous in the switching equation (1).

Such a two equation model is defined by Maddala (1983) as a bivariate recursive model. If  $u_i$  and  $v_i$  are not independent, a two-stage method is not appropriate to estimate the decision to switch equation. One has to use a maximum likelihood estimator, where the likelihood is built on the basis of the joint distribution of  $(s_i, y_i)$ . Conversely, if  $u_i$  and  $v_i$  are not correlated, both equations can be estimated separately.

## 6.2. Results

Equations (1) and (4) have been estimated with or without cantons fixed effects to deal with the unobserved heterogeneity between cantons. A joint estimation of the bivariate model (with or without fixed effects) led to a correlation coefficient  $\rho$  between  $u_i$  and  $v_i$ , which appears to be non significant, justifying a separate estimation (the significance level of the likelihood ratio test for  $\rho=0$  is equal to  $p=0.86$ ).

The decision to switch has been estimated by a logit estimator, considering two specifications, depending on whether the income is used as an explanatory variable or not. The results are displayed in table 4. They show that the expected gain of switching ( $dp$ ) influences positively the switching decision. Having subscribed to supplementary insurance has a significant negative impact on switching. The estimates are quite similar for the four specifications considered. The impact of the supplementary insurance is sizeable: *ceteris paribus*, it reduces the probability to switch by about 30 %.

Otherwise, we find that the probability to switch is continuously decreasing with age. This result is consistent with the empirical literature on switching behaviour we have reviewed above. The youngest (27-35) have a probability to switch which is more than 80 % higher than the reference age group (35-50) whereas the oldest (>65) have a much lower probability to switch (- 65 % to -67 %). The gender has no significant impact on the switching propensity, nor the subjective health status. Having chosen a deductible level higher than the basic deductible is linked with a significantly higher propensity to switch (+54 to +56 %).



Interestingly, the income level has no significant impact on the switching probability, once the choice for a deductible higher than the basic one and the subscription to a supplementary insurance have been taken into account. We know that these explanatory variables are both positively influenced by a high income level.

In the descriptive analysis, graph 5 has suggested the impact of the supplementary insurance to vary with age. To allow for this possibility, we have estimated the same model with cross effects of age group with the supplementary insurance dummy. This specification led to a loss in precision with many non significant coefficients.

Table 5 gives the average expected gain of switching (variable  $dp$ ), for switchers and non-switchers, with or without a supplementary insurance contract. Not surprisingly, we find that the average switching gain is larger for those who have indeed switched (CHF 15.75) than for non-switchers (CHF 2.21). The annual switching gain is therefore CHF 189 for switchers, i.e 124.7 €. Graph 6 displays the corresponding distributions of the annual switching gains for switchers and non-switchers.

The effect of supplementary contracts is more surprising. Since holding a supplementary insurance contract decreases the likelihood to switch, it may be interpreted as a switching cost, and we may expect that individuals with a supplementary contract would switch for larger switching gains than those without supplementary insurance. This is not the case: the average switching gain is CHF 13.06 for those with supplementary contracts, and CHF 19.44 for those without. This result suggests the existence of heterogeneity within switchers and deserves further investigation. Actually, people who are not holding supplementary insurance differ from the others as regards *the level* of their premium for the basic health insurance: their premiums appear to be higher, especially at the top of the distribution. More precisely, the average level of their monthly premium is CHF 6.2 higher, the first quartile of their monthly premium is CHF 6.5 higher and the third quartile of their monthly premium CHF 16.3 higher. The interpretation of our results could be the following. Individuals who are not holding supplementary insurance differ strongly from the others by their unobservable characteristics. If we suppose that they are characterized by a low level of education, their switching costs may be larger than for more educated people (information may be more difficult to collect and interpret). This effect could be large enough to more than compensate for the negative effect of holding supplementary insurance. The fact that people without a supplementary insurance pay higher premiums (for a given level of deductible), gives support to this interpretation.

Table 6 displays the results relative to the decision to subscribe to a supplementary insurance contract. They show that the decision to subscribe to a supplementary insurance contract is not a monotonic function of age: the probability of subscribing increases with age until the class 51-65. Then, it decreases for people older than 65. The premium differential has no significant influence on the decision to subscribe. Thus, the variables  $(dp)_i$  and  $s_i$  act as orthogonal variables in the model describing the decision to switch.

The income level has a significant positive influence on the propensity to buy a supplementary insurance. The magnitudes of the effects are amazing: the probability to subscribe is twice as high for an intermediate income

individual in comparison with a low income individual, and more than doubles (OR= 2.72) for the highest level of income. This result is opposed to the basic insurance theory, which predicts a lower absolute risk aversion for rich people. Therefore, they should be less likely to buy insurance. Our estimates suggest that the purchase of supplementary insurance is influenced, not only by risk aversion, but also by the willingness to pay for goods covered by the supplementary insurance.

Bad health has a negative influence on the subscription to a supplementary contract. But this influence is no longer significant when income is introduced into the specification. All the information about health seems to be captured by the income level: as stated above, a low income is strongly correlated with a bad health status (table 3bis). Moreover, risk selection may occur on the supplementary insurance market: high risks would be offered discouragingly high prices, or excluded altogether.

More thorough investigations are needed to understand the role of the supplementary insurance on the switching propensity. Indeed, we have seen that the income level has no significant impact on the switching propensity. However, it appears to have an indirect influence through the supplementary insurance, which is positively connected with the income level. In addition, the income level is negatively correlated with a bad health. Contrary to the health status, income and a supplementary insurance contract are observable by the insurance company, and can be used as tools for selection.

Are the limitations to switch induced by the supplementary insurance large enough to explain the lack of premium convergence ? We can use the estimates of equation (1) to have a first insight into this question.

Consider the distribution function of the logistic. Equations (1) and (2) give the expression of the probability to switch for individual  $i$  :

$$Prob(y_i = 1) = F(x_i' \beta + s_i \gamma + (dp)_i \eta)$$

This probability can be estimated by :

$$\hat{Prob}(y_i = 1) = F(x_i' \hat{\beta} + s_i \hat{\gamma} + (dp)_i \hat{\eta}) \quad (6)$$

where  $\hat{\beta}$ ,  $\hat{\gamma}$  and  $\hat{\eta}$  stand for the estimators of  $\beta$ ,  $\gamma$  and  $\eta$ .

This predicted probability varies with the observation considered. We want to focus on the respective impacts of the premium differential and of the supplementary insurance. To summarize these individual probabilities, we evaluate them for the average individual, except for the variable  $dp$ , which is allowed to vary over its range. This computation leads to a function  $g(dp_i)$  describing the switching probability according to the premium difference  $dp$ , when the individual has not subscribed to a supplementary insurance :

$$\hat{Prob}(y_i = 1 / x_i' = \bar{x}; s_i = 0) = F(\bar{x}' \hat{\beta} + (dp_i) \hat{\eta}) = g(dp_i)$$

The same computation is used to build the function  $h(dp_i)$  describing the switching probability according to the premium difference  $dp$ , when the individual has subscribed to a supplementary insurance :

$$\hat{Prob}(y_i = 1 / x_i' = \bar{x}; s_i = 1) = F(\bar{x}' \hat{\beta} + \hat{\gamma} + (dp_i) \hat{\eta}) = h(dp_i)$$

Graph 7 displays the curves for the functions  $g(dp_i)$  and  $h(dp_i)$ . Vertical lines are drawn to represent the values of the first and ninth deciles of the expected premium difference  $dp$  (equal to the expected gain to switch). In comparison with the range of  $dp$ , the limitations to switch due to the supplementary insurance is not very large, but non negligible.

## 7. Conclusion

Our results are the following:

- The introduction of a managed competition scheme for basic health insurance in Switzerland failed in reducing the premium variability: within canton, the premium variability appears to be stable between 1996 and 2005. This finding raises the question of the effectiveness of competition in Switzerland for the basic health insurance market.
- The switching decision is positively influenced by the expected gain of switching, measured by the premium differential.
- Holding a supplementary insurance contract substantially decreases the propensity to switch.
- For switchers, the expected monetary gain of switching is on average equal to CHF 15.75 per month, which amounts to an annual switching gain of CHF 189, , i.e 125 €.
- The expected gain of switching is higher for switchers with no supplementary insurance (CHF 19.44) than for switchers with supplementary insurance (CHF 13.06).
- The income level appears to be a key determinant in the behaviour that we study. It has a direct positive influence on the propensity to buy a supplementary insurance. This finding suggests that the purchase of supplementary insurance is influenced, not only by risk aversion, but also by the willingness to pay for the goods covered by the supplementary insurance, which would be higher for rich people.
- Bad health has a negative influence on the subscription to a supplementary contract, but is no longer significant when the income is introduced into the specification. All the information about health is captured by the income level, a low income being strongly correlated with a bad health status.
- Income and a supplementary insurance contract are observable by the insurance company, and can be used as tools for selection.
- Our estimates allow us to compute the switching probability as a function of the premium difference, which corresponds to gains of switching. This function is drawn for people with and without a supplementary insurance contract. In comparison with the range of the premium difference, the limitations to switch due to the supplementary insurance is moderate, though non negligible.

A better understanding of the effectiveness of competition on the basic health insurance market is of major interest for policy makers. Needless to say, competition puts providers under pressure only if consumers are able to switch from the least efficient to the more efficient funds, and potential barriers to switching may explain the persistence of inefficiencies. More specifically, two main reasons may explain the relatively limited prevalence

of switching behavior: lack of consumer information; risk selection practices. The identification of their relative importance has different policy implications: for instance, information campaigns are useless if consumer inertia is caused by the fear of selection. On the other hand, reforming risk adjustment mechanisms would miss the point if switching costs are related to consumer lack of relevant information. Our results deserve more thorough investigations in order to understand the role of the supplementary insurance on the switching propensity. They suggest that selection behaviours introduce perturbations into the dynamic of competition.

Beyond Switzerland, several countries already rely on competition to regulate social health insurance, and many countries contemplate the introduction of some managed competition between health insurance funds. Many ongoing reforms explicitly refer to the Swiss model. Social insurance usually covers a defined bundle of medical goods and services while, as in Switzerland, supplementary insurance contracts may cover additional services. Our analysis illustrates how the consumer choice for health plan interacts with the decision to subscribe to a supplementary insurance contract. If these private decisions are not independent, then the regulation of the supplementary health insurance market should integrate the effects it may have on the basic insurance market. This understanding is useful to analyse strengths and failures of current regulatory mechanisms at stake in Switzerland: basic insurance and supplementary insurance are regulated by two different laws (respectively, LAMal and LCA) and supervised by two different institutions (respectively, OFSP and OFAP).

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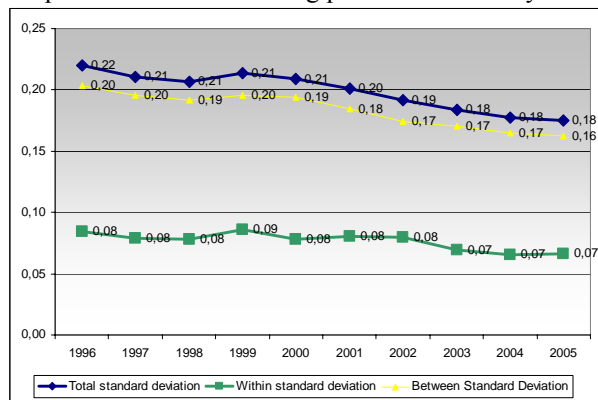
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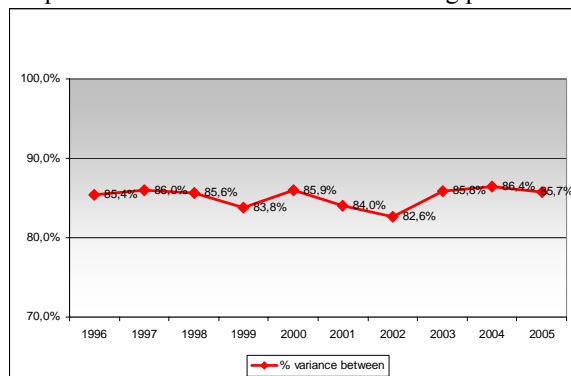
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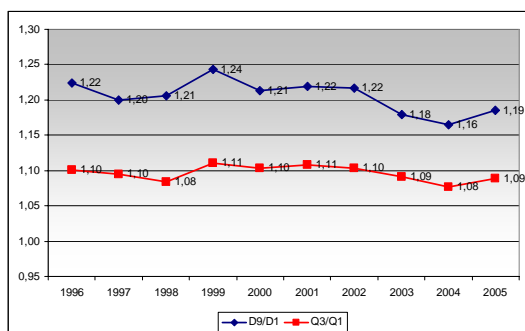
Graph 1: Evolution of the log premium variability



Graph 2: Share of the between cantons log premium variability



Graph 3: Ratio of D9/D1 and Q3/Q1 for premium  
(computed within cantons with a weighted average between cantons)



Graph 4: Ratio of D9/D5 and D5/D1 for premium  
(computed within cantons with a weighted average between cantons)

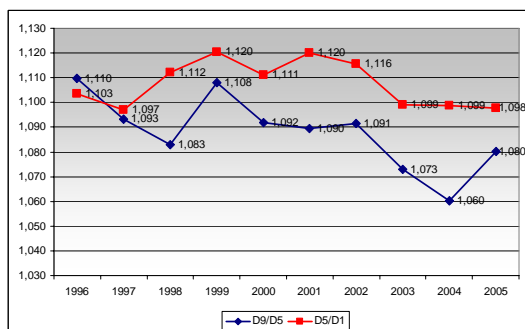




Table 1: Descriptive statistics

	% (n=1943)
Age: [27,35]	18.13
Age: [35,50]	36.87
Age: [51,65]	26.37
Age: >65	18.64
Household Income: < 5000 Swiss Francs per month	36.82
Household Income: 5000 - 8000 Swiss Francs per month	39.32
Household Income: > 8000 Swiss Francs per month	23.86
State Subsidy for the Premium (yes=1)	23.45
Gender: male	46.75
Education level: primary school	11.16
Education level: secondary school	11.11
Education level: apprentissage	51.77
Education level: apprentissage professionnel supérieur	14.18
Education level: university completed	11.73
Urban setting	78.75
Bad subjective health	16.92
Good subjective health	48.05
Very good subjective health status	35.03
Has the lowest (ordinary) deductible	56.48
Has any supplementary health insurance	74.81
Has a supplementary health insurance (except for "division commune Suisse entière")	64.57
Has switched between 1996 and 2000	14.34
Intends to switch in 2001	9.58

Table 2: Association between age, gender and supplementary insurance

	<b>No supplementary insurance</b>	<b>Supplementary insurance (except for "division commune Suisse entière")</b>	<b>p</b>
Age: [27,35]	42.37%	57.63%	
Age: [35,50]	31.94%	68.06%	
Age: [51,65]	29.32%	70.68%	
Age: >65	44.23%	55.77%	<0.001
Male	36.04%	63.96%	
Female	34.90%	65.10%	0.602

Table 3: Association between supplementary insurance and switch behaviour or intention (logistic regression)

	Has switched*		Intents to switch	
	Odds ratio	p**	Odds ratio	p**
Has a supplementary health insurance (except for "division commune Suisse entière") over the past 4 years	0.72	< 0.01	0.93	0.66

p\*\* = significance level

Table 3bis: Association between bad subjective health and several variables (logistic regression)

	Bad Health	
	Odds ratio	p**
<i>Income alone</i>		
Household Income: < 5000 Swiss Francs per month	ref	ref
Household Income: 5000 - 8000 Swiss Francs per month	0.33	< 0.001
Household Income: > 8000 Swiss Francs per month	0.21	< 0.001
<i>Supp alone</i>		
Has a supplementary health insurance (except for "division commune Suisse entière")	0.72	0.008
<i>Income and supp</i>		
Household Income: < 5000 Swiss Francs per month	ref	ref
Household Income: 5000 - 8000 Swiss Francs per month	0.33	< 0.001
Household Income: > 8000 Swiss Francs per month	0.21	< 0.001
Has a supplementary health insurance (except for "division commune Suisse entière")	0.94	0.641

p\*\* = significance level

Graph 5: Switching probability by age group and supplementary insurance status

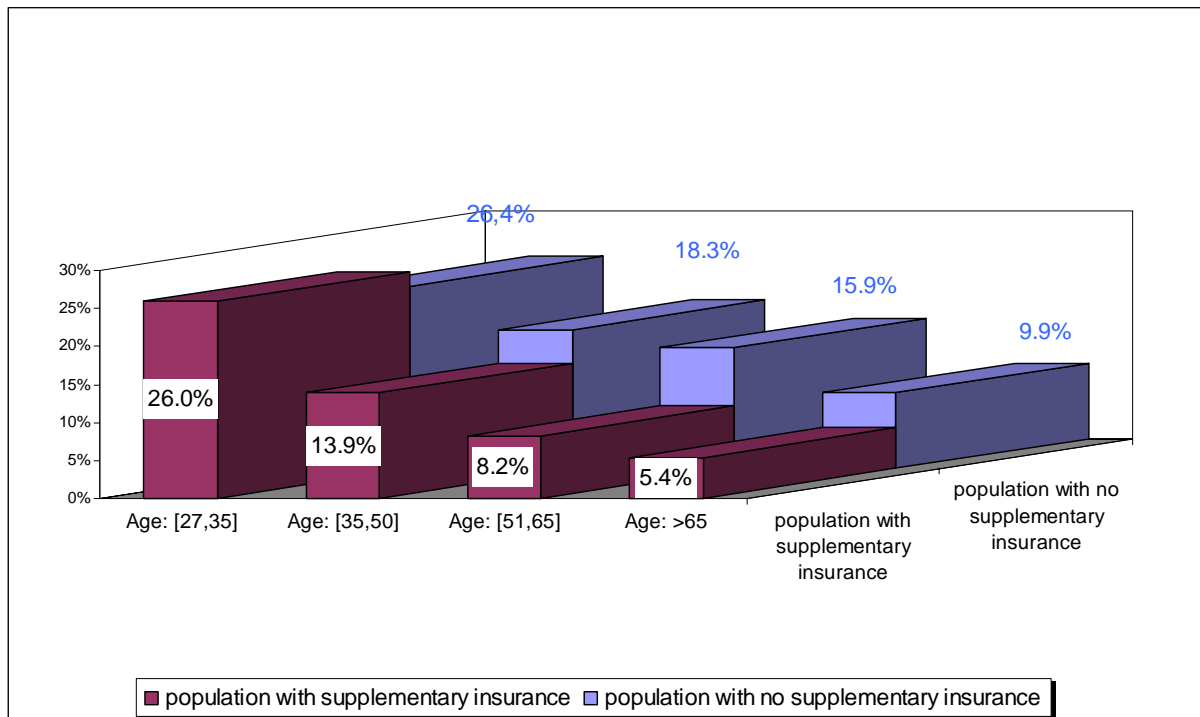


Table 4: Decision to switch

Explained variable: switch over the past 4 years

	Simple logistic				Fixed effects model			
	OR	p	OR	p	OR	p	OR	p
Age: [27,35]	1.89	<0.01	1.85	<0.01	1.84	0.00	1.81	<0.01
Age: [36,50]	<i>ref</i>	<i>ref</i>	<i>ref</i>	<i>ref</i>	<i>ref</i>	<i>ref</i>	<i>ref</i>	<i>ref</i>
Age: [51,65]	0.60	0.01	0.62	0.014	0.59	0.01	0.61	0.01
Age: >65	0.35	<0.01	0.35	<0.01	0.34	0	0.33	<0.01
Household Income: < 5000 Swiss Francs per month	-	-	<i>ref</i>	<i>ref</i>	-	-	<i>ref</i>	<i>ref</i>
Household Income: 5000 - 8000 Swiss Francs per month	-	-	0.86	0.36	-	-	0.87	0.41
Household Income: > 8000 Swiss Francs per month	-	-	0.93	0.74	-	-	1.00	0.99
State Subsidy for the Premium	-	-	1.34	0.07	-	-	1.34	0.08
Gender: male	0.95	0.69	0.97	0.86	0.99	0.95	1.02	0.91
Education level: university completed	1.04	0.84	1.07	0.75	1.02	0.93	1.03	0.9
Urban setting	0.73	0.05	0.74	0.07	0.67	0.03	0.68	0.04
Bad subjective health status	0.89	0.57	0.86	0.49	0.89	0.59	0.87	0.52
Option deductible (no ordinary deductible)	1.54	<0.01	1.58	<0.01	1.56	0.00	1.59	<0.01
Difference in premium (dp)*	1.04	<0.01	1.04	<0.01	1.04	0.00	1.04	<0.01
Has a supplementary health insurance**	0.71	0.02	0.73	0.03	0.70	0.02	0.72	0.03

\* dp is the expected gained of switching defined by equation (3)

\*\* any supplementary contract (except for "division commune Suisse entière")

All explanatory variables are qualitative variables, except for dp

The table displays the odd ratios

Table 5: Average premium difference

	<b>Average premium difference</b>		
	All individuals	Has no supplementary insurance	Has a supplementary insurance
Has switched	15.75	19.44	13.06
Has not switched	2.21	2.37	2.13

Graph 6: distribution of  $dp$  (premium difference) for switchers and non-switchers

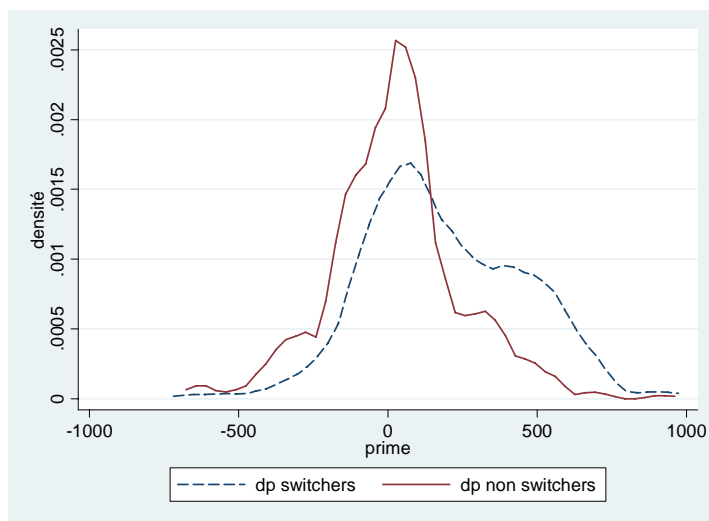


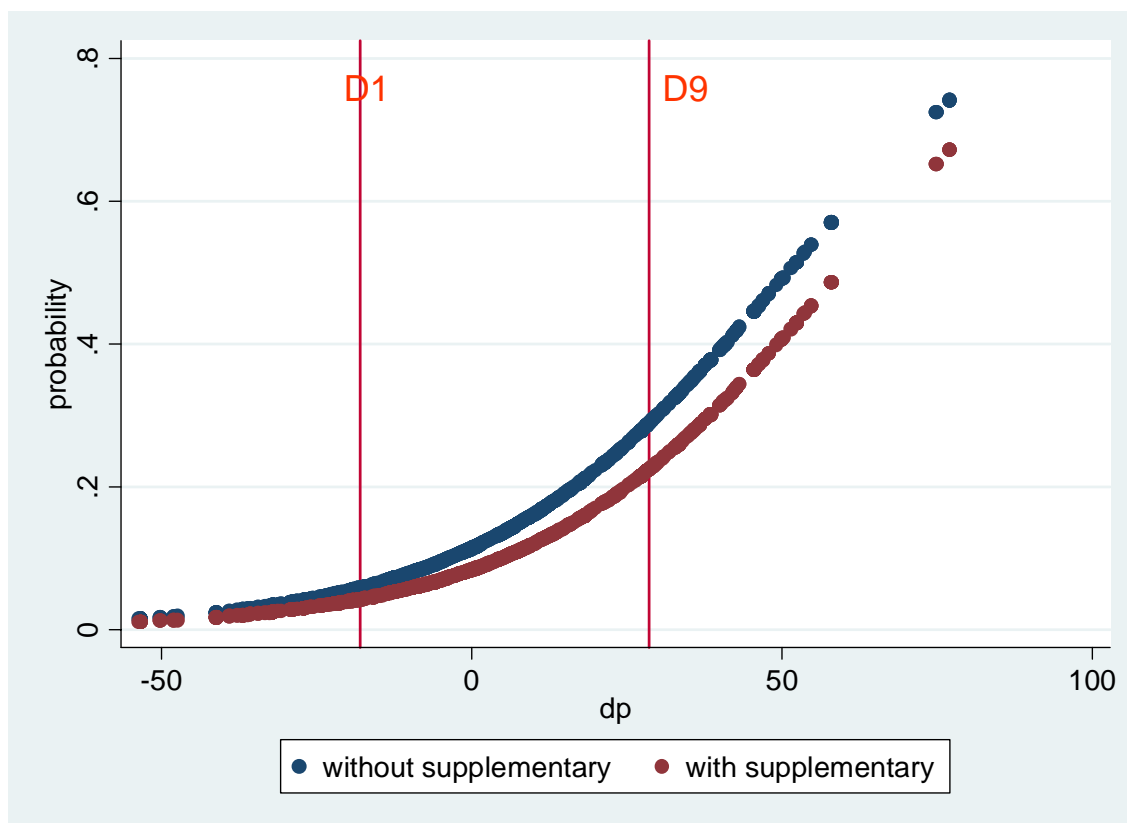
Table 6: Decision to subscribe to a supplementary

Explained variable: is covered by supplementary insurance*	Simple logistic				Fixed effects model			
	OR	p	OR	p	OR	p	OR	p
Age: [27,35]	0.62	<0.01	0.71	0.01	0.60	<0.01	0.68	0.01
Age: [36,50]	<i>ref</i>	<i>ref</i>	<i>ref</i>	<i>ref</i>	<i>ref</i>	<i>ref</i>	<i>ref</i>	<i>ref</i>
Age: [51,65]	1.24	0.10	1.28	0.06	1.24	0.10	1.29	0.06
Age: >65	0.68	0.01	0.93	0.60	0.66	0.00	0.90	0.50
Household Income: < 5000 Swiss Francs per year	-	-	<i>ref</i>	<i>ref</i>	-	-	<i>ref</i>	<i>ref</i>
Household Income: 5000 - 8000 Swiss Francs per year	-	-	2.02	<0.01	-	-	2.06	<0.01
Household Income: > 8000 Swiss Francs per year	-	-	2.72	<0.01	-	-	2.71	<0.01
Gender: male	0.91	0.31	0.80	0.02	0.87	0.17	0.77	0.01
Education level: university completed	1.24	0.17	1.00	0.99	1.34	0.07	1.06	0.73
Urban setting	1.00	1.00	0.97	0.77	1.03	0.82	0.98	0.91
Bad subjective health status	0.75	0.03	0.90	0.43	0.76	0.04	0.91	0.47
Option deductible (no ordinary deductible)	1.36	<0.01	1.26	0.02	1.43	<0.01	1.33	0.01
Difference in premium*	1.00	0.07	1.00	0.20	1.00	0.26	1.00	0.46

\* any supplementary contract (except for "division commune Suisse entière")



Graph 7: Association between Probability of switching and difference in premium



D1 and D9 refer to first and ninth deciles of premium differences  $dp$ . The graph represent the switching probability functions when the individual has or has not subscribed to a supplementary insurance.



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